

### **REMARKS**

In the Office Action mailed August 14, 2003 indicates that a restriction requirement was communicated to the Attorney of Record on May 19, 2003 requiring restriction of the application to one of the following inventions:

- I. Claims 1-91 drawn to an apparatus for preparing a substrate, classified in class 422 subclass 186 +; and
- II. Claims 92-120 drawn to a method for preparing a substrate, classified in 204, subclass 157.15+. The Examiner notes in paragraph 4 that a provisional election was made with traverse to prosecute invention GROUP II, Claims 92-120. The Examiner further notes that affirmation of this election must be made by the Applicant who is replying to the Office Action and that Claims 1-91 are withdrawn from further consideration as being drawn to a non-elected invention. The election of invention GROUP II, Claims 92-120 is affirmed.

The claims in the application have been amended to add new claims 121-124. Claims 1-91 having been withdrawn as being directed to a non-elected invention, claims 92-105 and 107-115; having been amended, claims 116-118 having been cancelled without prejudice, claims 119 and 120 having been amended and new claims 121-124 having been added by amendment, the claims now pending in the present application are claims 92-115 and claims 119-124. Favorable consideration is respectfully

requested.

In responding to the outstanding Office Action, reference will be made to page numbers in the Office Action. In this regard, reference to pages 2-14 will be references to the second set of page numbers following two initial pages numbered page 2 and page 3.

On pages 2-4 of the Office Action, the disclosure is objected to because of a number of informalities. Amendments to the Specification have been made to address each of these concerns. The amendments to the Specification are made in the same order of the objections. Some additional amendments have been made to correct typographical errors. In view of the amendments, it is believed that the objection to the disclosure is now mute.

On page 4 and 5 of the outstanding office action, the Examiner has objected to claims 99 and 100. Amendments have been made to both claims to address the informalities noted by the Examiner. In so far as the objections may be maintained with respect to these claims, reconsideration withdrawal is respectfully requested.

On page 5 of the outstanding Office Action, the Examiner has rejected claims 98, 116 and 117 Under 35 U.S.C. §112, second paragraph as being indefinite. Claim 98 has been amended to recite a preferred syntax. While it will be understood that electromagnetic radiation may include electromagnetic radiation other than infra red radiation, claim 98 is specifically asserted to distinctly claim infra red radiation.

In regard to claims 116 and 117, it is respectfully submitted that these claims have been cancelled without prejudice along with claim 118. These claims have been cancelled because of the perceived degree which the claims require further amendment

to address other informalities which the Applicant looks forward to addressing in further application.

On page six in detailed on pages 6-11, claims 92-114 are rejected under §103(a) as being unpatentable over Elliot et al. (U.S. Patent No. 5,669,979). The Examiner notes that Elliot teaches a method for preparing a substrate, the method comprising the steps of: generating an active zone using an electromagnetic radiation source 130; and exposing said substrate to said active zone whereby the substrate is modified for hearing a material comprising an adhesive onto said substrate by exposure to the active zone.

The Applicant has carefully reviewed and considered the disclosure of Elliot et al. and respectfully traverses the §103 rejection of the fore-mentioned claims.

In this regard, it is respectfully submitted that while Elliot et al. does disclose the use of electromagnetic radiation source that generates ultraviolet radiation to which a substrate is exposed Elliot et al. teaches only careful use of the ultraviolet radiation to ablate particles on a surface which is being cleaned according to the method. In this regard, it is noted that the Applicants invention is directed to a method of preparing a substrate for adherence of an adhesive material thereto. In this regard, it is important to impart sufficient energy to the surface of the substrate to excite chromophoric groups on the surface of the substrate so as to elicit greater functional capacity for bonding with an adhesive. As reported elsewhere, a chromophore or chromophoric group is an isolated function within a molecular structure that is not in congregation with any other group. These chromophores, when exposed to sufficient electromagnetic radiation, will elicit greater adhesive adherents at the surface of the substrate. If the intensity of the

electromagnetic radiation is not sufficient at the surface of the substrate, however, suitable adhesive adherents will not develop and surface adherents will not be enhanced as desired.

It will be appreciated that Elliot et al. have described a method for cleaning photo reactive surfaces (see column 26, lines 30-42) such cleaning is generally accomplished with a much lower energy intensity than is needed to elicit the adhesive adherence desired by the Applicants when implying the present method. For instance, when Elliot et al. disclose the use of "energy densities up to  $2000 \text{ mJ/cm}^2$  for cleaning as disclosed at column 13, lines 45-53, it is noted that such energy densities are directed to the surface only at "angles of about 80% from normal incidents (i.e., 10% relative to the normal substrate surface)." The disclosure continues to note that, "In this way, a much larger portion of the input energy can be directed at the foreign material unless energy is received by the substrate. Higher energy densities are useful for some particularly difficult cleaning tasks, such as the removal of vertical-standing flakes of ion-implanted photo-resist which strongly adhere to surface."

It is important to note, however, that when the angle of incidence is oblique relative to the surface of the substrate, such as, in the case of Elliot et al., a wafer surface, the use of an ultraviolet laser enhances the cleaning effect and, as stated in column 12 at lines 7-8, "reduces damage to the wafer surface for a beam of a given energy level."

Therefore, when an energy density of  $2000 \text{ mJ/cm}^2$  is delivered to the surface of a wafer, as disclosed in Elliot et al., the intensity of energy at the surface is not an energy up to  $2000 \text{ mJ/cm}^2$  but is reduced dramatically to as little as 17% of 2000

mJ/cm<sup>2</sup>. Therefore, when Elliot et al. disclosed the use of such an energy density, the disclosure does not indicate delivering such an intensity of electromagnetic radiation to the surface of the substrate, but rather a much lower energy intensity so as to be in a much lower range of electromagnetic radiation.

It is further noted that in column 5, lines 43-49 Elliot et al. provide a list of foreign materials to be removed from the surface of the substrates to be cleaned. The disclosure of Elliot goes into great detail about how to direct all types of radiation toward foreign materials to be removed from the substrate surface while avoiding any destructive treatment of the surface. At column 2, lines 46-48 Elliot et al. note that, "implementation of the invention may include the following features. The beam is delivered to the surface at an energy level insufficient to damage the surface." (emphasis added) at column 9, lines 55-58, Elliot et al. Note that, "the beam may be configured to cause ablation of the foreign material at an ablation surface which is normal to the beam not parallel to the surface of the substrate." In other words, Elliot et al. teach attacking the foreign material with radiation from this side, at an oblique angle to the substrate surface, not from the top at an angle much closure to perpendicular to the surface which would deliver a much greater intensity of radiation to the surface of the substrate.

It is respectfully submitted that independent claim 92 recites that the step of exposing occurs at substantially ambient pressure. In this regard, the Examiner's acknowledgement that, "Elliot does not teach wherein the method performed at substantially ambient pressure", at the bottom of page 7 of the outstanding Office Action, in this regard, it is respectfully submitted that it would not have been obvious

that one of ordinary skill in the art to perform the method at substantially ambient pressure because the method of Elliot requires that the reaction product will be "sucked away from the surface." (see column 2, line 25) While, as noted by the Examiner, Elliot et al. note that, "the atmospheric pressure in the vicinity of the foreign material may be raised or lower above or below the ambient") (see column 2, lines 33-35 the fluid must continue to flow drawing the reaction products away from the cleaned surface in order to accomplish the goals set out by Elliot et al. to clean the surface. Therefore, if Elliot et al. were employed at a substantial ambient pressure, the method will be effective to clean the surface. Therefore, Elliot et al. teach against the use of a substantially ambient pressure.

In the dependent claims, further recitations are provided. In claim 92, it is noted that the substrate includes a polymer. In this regard, the Examiner asserts that Elliot discloses ablation of small plastic optical fibers in column 26, lines 29-45. However, this is not the substrate surface Elliot et al. are attempting to clean but is rather simply an example of a fiber that the method of Elliot et al. is attempting to avoid damaging as the surface of the wafer or other like object is cleaned. As such, it is respectfully submitted that the method of preparing a polymer substrate for adherence of an adhesive material thereto is distinguished over Elliot et al.

In claim 94, a substrate including a sole of a shoe is recited. In this case, it is respectfully submitted that the method of preparing a substrate including a sole of a shoe is not disclosed by Elliot et al. Furthermore, the preparation of the substrate for adherence of an adhesive material is believed to be distinguished from the cleaning of a critical surface such as a wafer from which computer chips are created. It is respectfully

submitted that the recitations in claims 95, 96 and 97 are also distinguished from the substrates disclosed by Elliot et al. as well as the reasons for utilizing the method of Elliot et al.

In view of the foregoing, it is respectfully submitted that claim 92 and each of its dependent claims are patentably distinct with respect to Elliot et al. The remaining dependent claims add further recitations that are not disclosed in Elliot et al. in particular, dependent claim 101 recites the creation of an intensity of electromagnetic radiation at the surface of the substrate in a range from about  $2.0 \text{ J/cm}^2$  to about  $5000 \text{ J/cm}^2$  as discussed in and above, this range is well beyond the range of electromagnetic radiation disclosed by Elliot et al., because Elliot et al. delivers only up to  $2000 \text{ mJ/cm}^2$  in the vicinity of the surface of a substrate to be cleaned at an oblique angle of incidence which will clearly reduce the intensity of electromagnetic radiation at the surface of the substrate.

In claim 102, which recites intensity of the electromagnetic radiation of the surface of the substrate ranging from about  $10 \text{ J/cm}^2$  to about  $1000 \text{ J/cm}^2$ , provides a further limitation not disclosed by Elliot et al.

In claim 3, the method recites the step of exposing including conveying the substrate through the active zone using a conveyor system whereby the substrate is exposed to the active zone for a resident's time. In this regard, it respectfully submitted that the use of a conveyor system is greatly preferred over the use of a batch system in order to cost effectively use the method of the present invention in industrial settings. It is respectfully submitted that it would not be obvious to employ the method of the present invention with or without a conveyor system, so that using the method in

association with the conveyor system would not be obvious to one skilled in the art and is distinguished from the art presently cited in the present application.

The remaining dependent claims, depending from claims 92 provide additional limitations that further distinguish the present claims from the cited prior art reference.

On page 9 of the outstanding Office Action, the Examiner notes that, "Elliot teaches that energy densities from  $500 \text{ mJ/cm}^2$  to  $2000 \text{ mJ/cm}^2$  can be applied to a semiconductor wafer without damaging the wafer (column 8, lines 46-52)." In reviewing Elliot et al., however, it is respectfully noted that the incidents of the beam delivering the radiation is noted to be at an angle of  $80^\circ$  with respect to normal. As noted above, this will reduce the intensity of the radiation at the surface to as little as 17% of the radiation generated.

In view of the foregoing, it is respectfully submitted that claims 92-114 are now in condition for allowance. Insofar as the §103 rejections may be maintained with respect to these claims, reconsideration and allowance is respectfully requested.

On page 11, of the outstanding Office Action, claims 115-120 are rejected under §103 as being unpatentable over Elliot et al. for the same reasons applied to the forementioned claims.

In this regard, it is respectfully submitted independent claim 115 recites generating an active zone at substantially atmospheric pressure as well as exposing the surface of the substrate to electromagnetic radiation, wherein the intensity of the electromagnetic radiation at the surface of the substrate ranges from about  $10 \text{ J/cm}^2$  to about  $1000 \text{ J/cm}^2$ . It is respectfully submitted that Elliot does not disclose the use of a substantially ambient pressure nor does it disclose the recited range of intensity which



would be sure to damage the surface of the wafers that Elliot et al. purposes to clean. Therefore, in view of the foregoing, it is respectfully submitted that independent claim 115 and its remaining dependent claims, claims 119 and 120, are therefore patentably distinct over Elliot et al. Insofar as the §103 rejection may be maintained with respect to these claims, reconsideration and withdrawal is respectfully requested.

New claims 121-124 are respectfully submitted herewith. It is respectfully submitted that these claims fall within the Invention Group II to which the present application has been restricted and favorable consideration is respectfully solicited.

On page 13 of the outstanding office action, the Examiner notes that Cates et al. (U.S. Patent No. 5,512,123) teach a method for improving the capability of a surface of an organic substrate to bond with another material and Steen et al. (U.S. Patent No. 4,390,774) teach a method for treating non-electrically conducting work pieces using a laser. Following a review of these references, it is respectfully submitted that the claims now pending in the present application are patentably distinguishable over each of these references, whether taken alone or in combination with any of the other references cited of record in the present application.

The Examiner's consideration of the references submitted to the Office and listed on the Form PTO-1449 is noted with appreciation.

In view of the foregoing, it is respectfully submitted that the claims now pending in the present application are now in condition for allowance and notification to that effect is earnestly solicited.

Enclosed herewith, please find a Petition for a Three-Month Extension of Time submitted to extend the time for response to the outstanding Office Action from August

14, 2003 to February 14, 2004. The present response and the request for extension of time are being submitted herewith. Therefore, a check in the amount of \$475.00 for a Three-month Extension of time filing fee for a small entity, for which the present applicant qualifies, is enclosed herewith. Please charge any additional fees required to make the present response timely filed in the United States Patent and Trademark Office to Deposit Account No. 13-4300 of the law firm of the undersigned Attorney with respect to the outstanding Office Action. Thank you.

Also enclosed is a Revocation and Power of Attorney executed by the Applicant. Please address all further correspondence with respect to the present application to the undersigned attorney at the address provided. Thank you.

The Examiner is urged to contact the undersigned attorney by telephone at the telephone number provided below if the undersigned attorney can provide any further information to the Examiner that would be helpful or if there are informalities in the present application that can be addressed easily over the telephone to place the present application in condition for allowance.

The undersigned attorney looks forward to working with the Examiner to resolve any further issues standing in the way of the issuance of a notice of allowance for the present application.

The Examiner's cooperation and assistance in this regard will be appreciated.

Respectfully submitted,

For the Applicant,

By his Attorneys

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